

REMARKS

This paper is filed responsive to the Office Action mailed November 28, 2011. Claims 45, 49-51, 54-60, 62-64, 77, 79-81 are pending in the application. Claims 1-44, 47, 48, 52, 53, 61, 65-76, 78 and 82-85 have been canceled. Claims 45 and 77, 79 and 80 are amended. No new matter is added.

Information Disclosure Statement

References cited in the information disclosure statement filed September 5, 2006 were resubmitted in an information disclosure statement filed June 4, 2009 in full compliance with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609.

Specification

The first sentence in the disclosure has been amended to include the priority information associated with the present application.

Drawings

The drawings have been amended to include a descriptive label in the box labeled as 104 in Figure 1. An amended replacement drawing sheet is filed herewith.

Claim Objections

Claims 68, 70-72, 78-79 and 85 stand objected. Claim 68, 70-72, 78 and 85 have been cancelled and claim 79 has been amended to better clarify the invention. Applicants seek withdrawal of the objections.

Claim Rejections

Claims 45 and 77 stand rejected under 35 USC 101 as being directed to nonstatutory subject matter. Applicants have cancelled claim 82 and amended claims 45 and 77

to claim a step of storing the positions of the first, second, third and fourth points of the pelvis in a data processing device and a determining step performed by the data processor, and therefore request that the Examiner withdraw the rejection.

Claims 45-85 stand rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Pub. No. 2002/0077540 (Kienzle) in view of U.S. Patent No. 6,711,431 (Sarin).

Claim 45 defines a method for registering a pelvis of a subject in a lateral decubitus position that includes the steps of:

- while the subject is in the lateral decubitus position, determining the position of at least a first point of the pelvis and a second point of the pelvis in a first plane;

- while maintaining the subject is said lateral decubitus position, determining the position of at least a third point of the pelvis and a fourth point of the pelvis in a second plane, wherein the second plane is perpendicular to the first plane, wherein the first plane is the frontal pelvic plane and the second plane is the mid-sagittal pelvic plane;

- storing the positions of the first, second, third and fourth points of the pelvis in a data processing device; and

- using the data processing device to determine the position of a third cardinal plane of the pelvis, wherein the third cardinal plane is perpendicular to the first cardinal plane and second cardinal plane.

Claim 77 defines a method for registering a pelvis of a subject in a lateral decubitus position that includes the steps of:

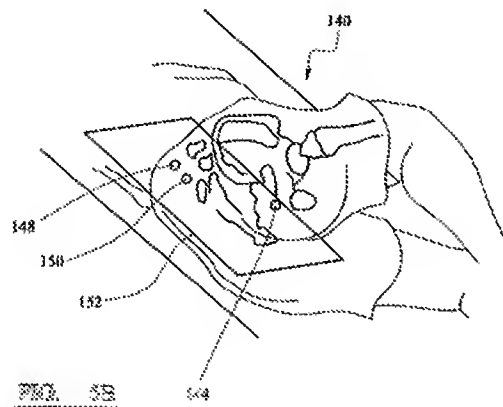
- while the subject is in the lateral decubitus position, calculating the position of a first cardinal plane of the pelvis using the position of at least a first point and a second point located in a first plane parallel to the first cardinal plane;

- while maintaining the subject is said lateral decubitus position, calculating the position of a second cardinal plane of the pelvis using the position of at least a third point and a fourth point located in a second plane parallel to the second cardinal plane, wherein the first plane is the frontal pelvic plane and the second plane is the mid-sagittal pelvic plane;

storing the positions of the first, second, third and fourth points of the pelvis in a data processing device; and

using the data processing device to calculate the position of a third cardinal plane of the pelvis, wherein the first, second and third cardinal planes are mutually perpendicular.

Thus, claims 45 and 77 are amended to clarify that when performing the first determining (or calculating step) the subject is in "a lateral decubitus position", and that lateral decubitus position is maintained while performing the second determining (or calculating) step. Support for this amendment is provided at page 9, lines 8 to 9, line 27 and page 10, lines 24 to 25 and 28 to 29. The lateral decubitus position is depicted in Figures 1 and 5B of the application. Figure 5B is depicted below:



In addition, claims 45 and 77 are amended to clarify that the first plane is the frontal pelvic plane and the second plane is the mid-sagittal pelvic plane.

By way of contrast, neither Kienzle nor Sarin disclose the claimed method of registering the pelvis of a patient in a lateral decubitus position. According to the method described in Kienzle, "the patient is placed on his or her side on the operating room table and draped in the usual fashion," and thereafter the surgeon uses a probe to identify landmarks. Kienzle, paragraph 45. Kienzle thus describes a method of registering the pelvis of a patient in a lateral position.

Once the patient is in the lateral position, the

surgeon then uses a probe (150) outfitted with localizing emitters (177) to identify three landmarks (182, 183 and 184) by positioning the probe (150) in such a manner that the virtual probe tip (156) overlays the image (173) of the first bony landmark (183) in both views (171, 172). By pressing the footswitch, the system reads the pose of the probe (150) and calculates and records the three-dimensional location of the landmark (183). In this manner, the surgeon records the positions of the left anterior superior iliac spine (ASIS) (182), the right ASIS (183) and the top of the pubic symphysis (184). Alternatively, other bony landmarks may be selected without departing from the instant invention.

Kienzle, paragraph 45. The method disclosed in Kienzle, however, is not capable of being used to define the pelvic reference system when the patient is the lateral decubitus position as the surgeon would not be able to capture both the left and the right ASIS when the patient is in the lateral decubitus position. Depending on whether the patient is lying on his/her left or right side, when the patient is in the lateral decubitus position, either the left ASIS or the right ASIS is simply not accessible by the surgeon, without moving the patient, which of course would create an error in defining the plane. Thus, Kienzle does not describe a method of registering a hip pelvis when the patient is in the lateral decubitus position.

Sarin describes a non-imaging computer assisted navigation system for hip replacement surgery where the patient 24 is clearly shown in Figure 1 in a **supine position**. Sarin defines the position of the pelvis using an optically trackable manual probe to palpate for easily located and anatomical landmarks on the pelvis. Sarin, col 8:8-19. The specific landmarks used are the ipsilateral ASIS, the contralateral ASIS, an ipsilateral pubic tubercle and a contralateral pubic tubercle. Sarin, col 8:20-38 and Figures 9 and 10. Thus, Sarin, like Kienzle, uses the ipsilateral ASIS and the contralateral ASIS to define a plane. And like Kienzle, Sarin thus cannot describe a method of registering a pelvis when the patient is in the lateral decubitus position as the ipsilateral ASIS and the contralateral ASIS are not accessible when the patient is in that position.

Further, neither Kienzle nor Sarin disclose determining (or calculating) the frontal and mid-sagittal planes, and then using those planes to determine (or calculate) a third plane that is orthogonal to the frontal and mid-sagittal planes. Kienzle describes using the defined landmarks to determine the frontal plane and the axial plane:

As shown in FIG. 9, the three landmarks (182, 183 and 184) are used to define a pelvic coordinate system. The first axis (185) of the pelvic coordinate system is contained in a line between the left ASIS (182) and right ASIS (183), a second axis (186) is perpendicular to the first axis and extends through the top of the pubic symphysis (184), and the third axis (187) is orthogonal to the first two axes (185 and 186). The "frontal" plane (188) is defined by the first two axes (185 and 186) and is considered by many orthopaedic surgeons to represent the standard vertical plane of the pelvis (181) during ambulation. Likewise, the axial plane (189) is defined by the first and last axes (185 and 187); and a third plane, the sagittal plane (not shown), is defined by the last two axes (186 and 187). Alternatively, other axes and planes may be defined without departing from the instant invention.

Kienzle, paragraph 46. Sarin, similarly uses landmarks to define the frontal and axial planes. See Figures 9 and 10.

Thus, Kienzle and Sarin fail to describe the claimed method at least they do not describe registering the pelvis of a patient in a lateral decubitus position and using the captured position of first and second anatomical features to define or calculate the mid-sagittal pelvic plane.

Hence, the present invention adopts an entirely different approach to that used in the prior art and the Applicants are the first to have considered and discovered how to register a patient in the lateral decubitus position. Further, they have discovered a set of anatomical position data which can be used in order accurately to determine the planes of a pelvis so that the pelvis position can be registered with a computer system while the patient is in the lateral decubitus position. None of the prior art addresses this problem. Applicants thus request withdrawal of the rejection.

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Serial No. 10/598590

Please charge any fee associated with the prosecution of this application to Deposit Account No. 10-0750. Applicants submit that the application is presently in condition for allowance and request favorable reconsideration and early notice of allowance. If it would speed prosecution, the Examiner is encouraged to contact the undersigned attorney by telephone.

Respectfully submitted,

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